

Medical Science

To Cite:

Dhage P. Perspectives of “Mulligan’s superior-oblique glide” on pain and functional disability in the acute stage of Prolapsed Intervertebral Disc: A case report. *Medical Science* 2024; 28: e35ms2808
doi: <https://doi.org/10.54905/dissci.v28i146.e35ms2808>

Authors’ Affiliation:

Assistant Professor, Ravi Nair Physiotherapy College, Datta Meghe Institute of Higher Education and Research, Sawangi Meghe, Wardha, Maharashtra, India

*Corresponding Author

Assistant Professor, Ravi Nair Physiotherapy College, Datta Meghe Institute of Higher Education and Research, Sawangi Meghe, Wardha, Maharashtra, India
Email: physiopoojadhage@gmail.com

Peer-Review History

Received: 04 January 2024
Reviewed & Revised: 08/January/2024 to 18/April/2024
Accepted: 22 April 2024
Published: 27 April 2024

Peer-review Method

External peer-review was done through double-blind method.

Medical Science
pISSN 2321–7359; eISSN 2321–7367



© The Author(s) 2024. Open Access. This article is licensed under a [Creative Commons Attribution License 4.0 \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.



Perspectives of “Mulligan’s superior-oblique glide” on pain and functional disability in the acute stage of Prolapsed Intervertebral Disc: A case report

Pooja Dhage*

ABSTRACT

Low back pain is the most common cause of disability in the overall population, most of the time mild pain gets ignored by the patients which leads to functional limitation and the condition worsens by micro trauma and sudden wear and tear forces. It seems to be challenging for the diagnosis and treatment as well. In this case, study a 28-year-old female complained of pain and heaviness in her left leg. Unable to bear weight on the leg appropriately for 15 days. Through history, physical examination, and investigations, she has been diagnosed with an acute onset of PIVD. There are so many physiotherapeutic approaches available to treat low back pain, but there is a paucity of manipulation therapy approach in the acute stage of PIVD. This study will summarize the importance of superior-oblique glide of MWM in the lumbar spine combined with the peroneal nerve mobilization, in the acute stage of PIVD.

Keywords: Mobilisation with movement (MWM), Prolapsed intervertebral Disc (PIVD), Hypomobility.

1. INTRODUCTION

Low back pain is the leading cause of disability in the overall world. Traumatic and nontraumatic overactive injuries are the usual causes of sudden onset low back pain. Low back discomfort may result from abrupt wear and tear forces. Around 48 to 60% of people survived low back pain, which follows the path of spectrum in the form of various types of pain, associated with overlapping intensity and frequency of pain (Gerhardt et al., 2018; Hahne et al., 2010). A sedentary style and modern technology are predicted to be the barriers to low back discomfort. It gradually rises with age. High among females and people in the 40-50 age (Hoy et al., 2012). Neurological involvement is a known cause of

neuropathic pain. This is linked to functional disability, high pain intensity, and consequently difficulty to managing. About 40 to 50% of people show low back pain associated with neural involvement (Meucci et al., 2015).

Prolapsed intervertebral disc diseases are the most common causative factors of low back pain. Disc lesions are more frequently observed on the lumbar segment at the L4 and L5 levels than on other spinal segments (Sharma et al., 2017). It affects both young and old people equally. Repetitive stress was reported to cause annular and radial cracks in young people. It results from degenerative changes in older populations (Urits et al., 2019; Vatte et al., 2016). The intervertebral disc contains a nucleus pulposus in the center, which is encircled by annulus fibrosis, and end plates surround the superior and inferior halves of the disc. A healthy disc is well hydrated with glycosaminoglycan (GAG), and fine collagen fibers type I and type II. A damaged intervertebral disc causes stress on the spine, mechanical deformation of the vertebral bodies, and neurological involvement. Sustained improper overloading of the line can lead to overactivation and under activation of core muscles and paraspinal muscles. So, it's necessary to treat the kinetics of spine in correlation with kinematics (Vergroesen et al., 2015).

Manual therapy techniques have shown a superior and positive impact on musculoskeletal conditions. The spine is innervated by nerves, facet joints, articular processes, and transverse and spinous processes bounded by the ligaments and muscles. Hypomobility in the vertebral bodies affects these structures which lead to discomfort in the back and radiating symptoms into the limbs. It is manifested by structural and functional impairment. Mobilization with Movement (MWM) described by Brian Mulligan, with the addition of passive overpressure helps to improve positional fault and increase ROM. Positional fault arises due to injury which led to mal tracking in articular surfaces. The positional fault is defined as, a minor deterioration of articular surfaces that are not be seen radiologically, but we can find out by checking passive accessory glide, micro mal-alignment of articular surfaces exist pain, stiffness, and weakness in the muscles (Hing et al., 2009; Reyhan et al., 2020).

Neural mobilization, nerve mobilized in specific manner along the course of the nerve. It helps to ease the symptoms of nerve impingement by facilitating movement in neural structures and their surroundings, studies showed that it also reduces intraneural edema. In neural mobilisation there is a flying and gliding of movements that occur inside the nerves it helps to relocate the exact pain (Basson et al., 2017). Pressure biofeedback is a useful tool for quantifying the core musculature strength. Transverse abdominis which is the deep stabilizer help to hold the spine in an appropriate manner associated with the quadratus lumborum muscle, rectus abdominis, and internal and external obliques. These muscles help maintain the spine's orientation within the optimal loading (Crasto et al., 2019).

2. PATIENT INFORMATION AND CLINICAL ASSESSMENT

A 29-year-old female has had gradual onset of pain for 5 years and sometimes she feels heaviness in her left leg but she ignored her symptoms for a long time and continues with her work.

Occupational history

She is a farmer by occupation, and has continued to work with forward bending and standing. Heavy weight lifting and including household activities.

Patient's findings

A 29-year-old female came to the physiotherapy department with complaints of low back pain in the last 15 days and heaviness in the left leg in the last 6 days with a history of heavy weight lifting, when she was working on the farm, suddenly she bends forward and lifts a heavy sac, and she experiences excruciating pain in her lower back and was unable to stand and walk. Immediately the other workers took her to the local hospital where the physical examination was done and referred to another hospital, for x-rays and MRI. Then she went to the government hospital and MRI was done and reveal disc bulging in MRI scanning, Orthopaedician prescribed some medications and advice for rest and was referred to physiotherapy after 5 days since onward physiotherapy treatment continue. The patient doesn't have any past medical and surgical history except for episiotomy. On examination, the patient was examined in supine, prone and standing position.

Pain Pattern

Extension Bias. Table 2 shows pre-and post-treatment pain assessment on rest and activity.

Spasm

Paraspinal muscle spasm was present.

Tenderness

Grade 2 at L3- L4- L5 Levels.

ROM

AROM of the lumbar spine is reduced and lumbar flexion and side flexions were painful. Lumbar Flexion is grossly reduced. The extension was pain-free. Table 3 shows pre- and post-treatment readings of lumbar flexion and extension.

End Feel

Abnormal soft tissue stretch for lumbar flexion

Normal Tissue stretch for lumbar extension

Joint Play

Passive accessory glide hypomobile at L4 and L5 level.

MMT

1) MMT of core muscle is poor, checked by pressure biofeedback

2) MMT of hip musculature measured by Kendal guidelines. Table 4. Shows pre- and post-treatment muscle strength of the core and hips.

Special Test

Modified SLR test was positive. For the peroneal nerve

FABERS was positive

Functional Activity

Functional Activities assessed by using Oswestry Low Back Disability Questionnaire Table 5. Shows the pre- and post- treatment, reading of functional disability.

3. INVESTIGATIONS

MRI scanning was done figure 1, 2 and 3 showing the findings of MRI.



Figure 1 Postero central disc bulge at L4 level

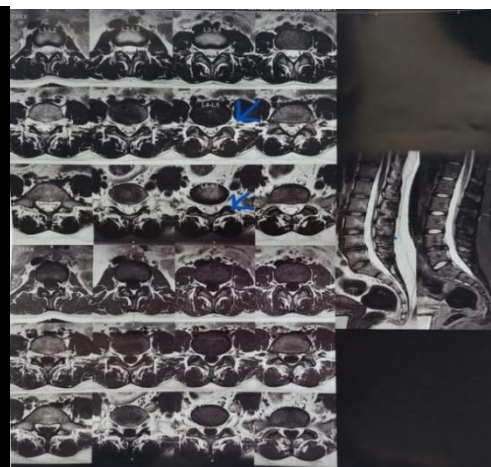


Figure 2 Ligamentum flavum hypertrophy



Figure 3 Degenerative changes at lumbar vertebrae MRI of Lumbar spine

Table 1 Therapeutic Intervention

Days	Intervention	Clinical Reasoning
For 1 week 3 times a week	Hydrocollator pack, for 10 mins.	Increase in the blood flows to the small blood vessel I.e., capillaries and arterioles. Which leads to vasodilatations, and help to reduce spasm.
	MWM had been given to the spine at the L4 level. Cephalad glide to L4 with passive lumbar extension was given. Glide was sustained for 5 repetitions. 3 sets (Figure 4 & 5).	Vibration and thermal sensation synapse in substantia gelatinosa in the posterior horn cell, of the spinal cord, inhibit pain sensation and activation neurotransmitters enkephalins, and endorphins. Correcting pathomechanics of surrounding joints leads to an increase in ROM.
	Neural mobilization for peroneal nerve. 10 repetitions 5 sets 10 second pauses in between each set (Figure 6).	Sliding and gliding movement in the nerves leads to the activation perineurium and fascicles helping to reduce intraneural tension within the nerves.

	<p>Home Exercise Programme Advised from 2nd session of mobilization period. Core stabilization exercises Drawing in manure. Abdominal tucking 10 seconds hold 3 sets, 10 Repetitions. Pelvic tilting exercises. 3 sets, 10 Repetition. Daily for 6 days.</p>	<p>Stabilization exercise help to build up neuromuscular control of the position. Help to relocate the orientation of muscle fibers.</p>
2-3 Weeks 3 times a week	<p>Conventional Exercise therapy program. Continued core stabilization exercises as a home program.</p> <ul style="list-style-type: none"> Started mobility exercises. Segmental Pelvic bridging exercises. <p>William's flexion exercises. 10 repetitions, 3 Sets.</p>	<p>Help to teach awareness of movement, activation of rectus abdominis, and key muscle of Pelvic movement.</p>
	<p>William's flexion exercises. 10 repetitions, 3 Sets.</p>	<p>Initiation of lumbar flexion helps to distress the spine, and avoid the recurrence of pain by activating gluteal and lumbar muscles.</p>
	<p>Cat and camel exercise 10 repetitions, 3 sets. Initial two sessions for cat exercise and then continued with cat and camel simultaneously.</p>	<p>Segmental organization of vertebrae inappropriate manner, helps to normalize the kinetics of the spine.</p>
	<p>Hip extensor strengthening (Gluteus maximus). With ½ kg weight cuff progress to 1 kg weight cuff 3 sets, 10 repetitions. Hip flexor strengthening exercise started in 3rd week onward. (Iliopsoas) ½ kg weight cuff. 3 sets, 10 Repetition.</p>	<p>Help to generate intramuscular coordination, hypertrophy of muscle fibers leads to expand the cross-sectional area of muscles and recruits fast-twitch muscle fibers.</p>

MWM Cephalad Glide and Peroneal Nerve Mobilization



Figure 4. Step 1



Figure 5. Step 2

MWM, “Superior-Oblique Glide”.

Two therapists or assistance are required. The hypothenar eminence of the hand is placed on the L4 level and glides the spinous process of the L4 vertebra to the superior-oblique direction, towards the eyeball of the patient. Assistance has been given by another therapist by placing the hand below the upper thorax and performing passive lumbar extension. Fig 4 and Fig 5.

For neural mobilization of the peroneal nerve, the therapist distracts the ankle with one hand and performs inversion and plantarflexion with the other hand. Fig 6.



Figure 6. Peroneal Nerve Mobilization

Outcome Measures

Table 2 NPRS On Rest and Activity (Numerical Pain Rating Scale) (Kraemer and Looney, 2012).

Activities	Pre-treatment	After 1 week	After 3 weeks
Pain at Rest	08/ 10	0/10	0/10
Bending forward	10/10	3/10	0/10
Bending backward	07/10	01/10	0/10

Table 3 Range of Motion (Assessed by the Modified Schober’s Test) (Malik et al., 2016).

Lumbar AROM	Pre-Treatment	After 1 week	After 3 weeks
Flexion	2 cm	7cm	8 cm
Extension	2 cm	2.5 cm	2.5cm

Manual Muscle Testing (MMT) (Khan et al., 2022)

Core muscles testing measured by pressure biofeedback. For the quantification of lumbar muscle strength, pressure is increased up to 40 mm of Hg. The patient should be in crook lying pressure biofeedback placed below the lumbar region and ask the patient to press the back and ranges have measured.

Manual muscle testing for hip musculature assessed by Kendal guidelines.

Table 4 MMT

MMT	Pre-Treatment	After 1 week	After 3 weeks
Core Muscles	42 mmHg	59 mmHg	107 mmHg
Hip Flexors	NA due to pain	3	4 +
Hip Extensors	NA due to pain	3	4 +

NA- Not assessed*

Table 5 Functional Disability. Oswestry Low Back Disability Questionnaire (Kraemer and Looney, 2012).

Score	Pre-Treatment	After 1 week	After 3 weeks
	37	17	02

4. DISCUSSION

In the above case we found there is an immediate reduced in pain and increased ROM in PIVD, supported by the study of Sadaf Shafique et al., (2019) on pain and functional disability of cervical spine and arm movement, they perform neural mobilization combined with MWM to cervical region and traction. Pain alleviation results from the activation of pain fibers, both slow and fast, and stimulation of the descending pain pathway, which secretes opiates and enkephalins and enhances noradrenaline under the control of PAG (Rao et al., 2018). Hydrocollator packs, stimulates the thermal receptors of the skin and enhances vasodilation of the small blood vessels. and help to reduce localized spasms (Charkoudian, 2003).

In disc bulging there is wedging response of vertebrae and anterior compression. Sustained gliding helped to revert wedging response and realigned the structures. Correct the movement pattern (Jaumard et al., 2011). Bulging may sometimes impinge the nerves and there must be neurological involvement, inflammation of the nerves, or intraneural oedema. Interfascicular movement facilitate the movement of surrounding connective tissues. Interaction of closing and opening nerve axonal flow (Ellis et al., 2022). Muscle strengthening recruited more muscle fibres increases the cross-sectional area of muscle activate alpha motor neuron in the brain, recruiting more motor units, and the result highest force production (Kraemer and Looney, 2012).

5. CONCLUSION

Mobilization with movement is a successful manual treatment strategy for treating the acute stage of PIVD; it helps to reposition the lumbar spine's mechanical alignment. To strengthen the muscles in the spine and avoid the recurrence of PIVD symptoms, a traditional program is a complementary therapy strategy used in conjunction with MWM.

Author's Contribution

The writer offered their quality effort for the idea, evaluation, assessment, and processing of data.

Informed consent

The Written & Oral informedconsent was obtained from the patient to prepare & publish the case report.

Abbreviations

- PIVD: Prolapsed Intervertebral Disc
- MWM: Mobilisation with Movement
- ROM: Range of Motion

NPRS: Numerical Pain Rating Scale

Funding

This study has not received any external funding.

Ethical approval

Not applicable.

Conflict of interest

The author declares that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

REFERENCES

1. Basson A, Olivier B, Ellis R, Coppieters M, Stewart A, Mudzi W. The Effectiveness of Neural Mobilization for Neuromusculoskeletal Conditions: A Systematic Review and Meta-analysis. *J Orthop Sports Phys Ther* 2017; 47(9):593-615. doi: 10.2519/jospt.2017.7117
2. Charkoudian N. Skin blood flow in adult human thermoregulation: how it works, when it does not, and why. *Mayo Clin Proc* 2003; 78:603–612. doi: 10.4065/78.5.603
3. Crasto FB, Montes AM, Carvalho P, Carral MC. Pressure biofeedback unit to assess and train lumbopelvic stability in supine individuals with chronic low back pain. *J Phys Ther Sci* 2019; 31(10):755–759. doi: 10.1589/jpts.31.755
4. Ellis R, Carta G, Andrade RJ, Coppieters MW. Neurodynamics: is tension contentious? *J Man Manip Ther* 2022; 30(1):3–12. doi: 10.1080/10669817.2021.2001736
5. Gerhardt J, Bette S, Janssen I, Gempt J, Meyer B, Ryang YM. Is eighty the new sixty? Outcomes and complications after lumbar decompression surgery in elderly patients over 80 years of age. *World Neurosurg* 2018; 112:e555–e560. doi: 10.1016/j.wneu.2018.01.082
6. Hahne AJ, Ford JJ, McMeeken JM. Conservative management of lumbar disc herniation with associated radiculopathy: a systematic review. *Spine (Phila Pa 1976)* 2010; 35(11):E488-504. doi: 10.1097/BRS.0b013e3181cc3f56
7. Hing W, Bigelow R, Bremner T. Mulligan's mobilization with movement: A systematic review. *J Man Manip Ther* 2009; 17: E39-E66. doi: 10.1179/jmt.2009.17.2.39E
8. Hoy D, Bain C, Williams G, March L, Brooks P, Blyth F, Woolf A, Vos T, Buchbinder R. A systematic review of the global prevalence of low back pain. *Arthritis Rheum* 2012; 64(6):2028–2037. doi: 10.1002/art.34347
9. Jaumard NV, Welch WC, Winkelstein BA. Spinal facet joint biomechanics and mechanotransduction in normal, injury and degenerative conditions. *J Biomech Eng* 2011; 133(7):71010. doi: 10.1115/1.4004493
10. Khan M, Zafar H, Gilani SA. Inter-rater reliability of pressure biofeedback unit among individuals with and without chronic low back pain. *Pak J Med Sci* 2022; 38(4Part-II):987–991. doi: 10.12669/pjms.38.4.4952
11. Kraemer WJ, Looney DP. Underlying mechanisms and physiology of muscular power. *Strength Cond J* 2012; 34(6):13–19. doi: 10.1519/SSC.0b013e318270616d
12. Malik K, Sahay P, Saha S, Das RK. Normative values of modified - modified schober test in measuring lumbar flexion and extension: A cross- sectional study. *Int J Health Sci Res* 2016; 6(7):177-187.
13. Meucci RD, Fassa AG, Faria NM. Prevalence of chronic low back pain: systematic review. *Rev Saude Publica* 2015; 49:1. doi: 10.1590/S0034-8910.2015049005874
14. Rao RV, Balthillaya G, Prabhu A, Kamath A. Immediate effects of Maitland mobilization versus Mulligan Mobilization with Movement in Osteoarthritis knee- A Randomized crossover trial. *J Bodyw Mov Ther* 2018; 22(3):572–579. doi: 10.1016/j.jbmt.2017.09.017
15. Reyhan AC, Sindel D, Dereli EE. The effects of Mulligan's mobilization with movement technique in patients with lateral epicondylitis. *J Back Musculoskelet Rehabil* 2020; 33(1):99–107. doi: 10.3233/BMR-181135
16. Shafique S, Ahmad S, Rehman S. Effect of mulligan spinal mobilization with arm movement along with neurodynamics and manual traction in cervical radiculopathy patients: A

- randomized controlled trial. *J Pak Med Assoc* 2019; 69(11):1601-1604. doi: 10.5455/JPMA.297956
17. Sharma A, Sargar K, Salter A. Temporal evolution of disc in young patients with low back pain and stress reaction in lumbar vertebrae. *Am J Neuroradiol* 2017; 38(8):1647–1652. doi: 10.3174/ajnr.A5237
18. Urits I, Burshtein A, Sharma M, Testa L, Gold PA, Orhurhu V, Viswanath O, Jones MR, Sidransky MA, Spektor B, Kaye AD. Low back pain, a comprehensive review: pathophysiology, diagnosis, and treatment. *Curr Pain Headache Rep* 2019; 23(3):23. doi: 10.1007/s11916-019-0757-1
19. Vatte R, Bansal D, Gudala K, Ghai B. High prevalence of neuropathic pain component in patients with low back pain: evidence from meta-analysis. *Value Health* 2016; 19(3):A242. doi: 10.1016/j.jval.2016.03.1085
20. Vergroesen PA, Kingma I, Emanuel KS, Hoogendoorn RJ, Welting TJ, Royen BJ, Dieën JH, Smit TH. Mechanics and biology in intervertebral disc degeneration: a vicious circle. *Osteoarthritis Cartilage* 2015; 23(7):1057–1070. doi: 10.1016/j.joca.2015.03.028